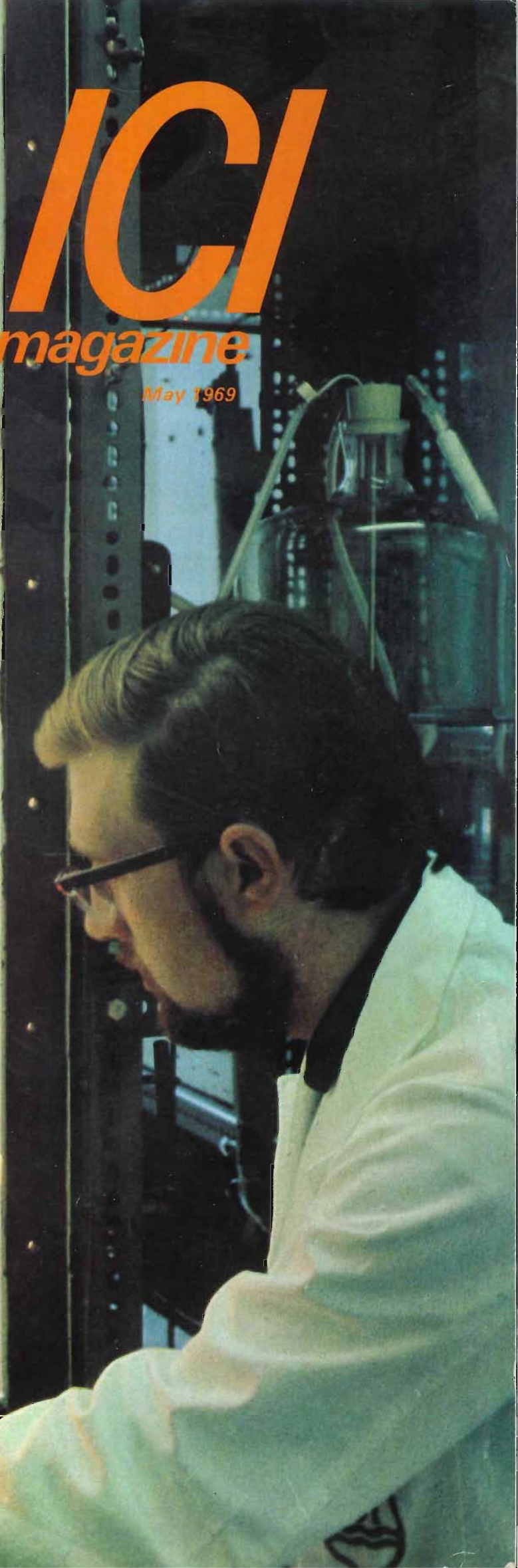
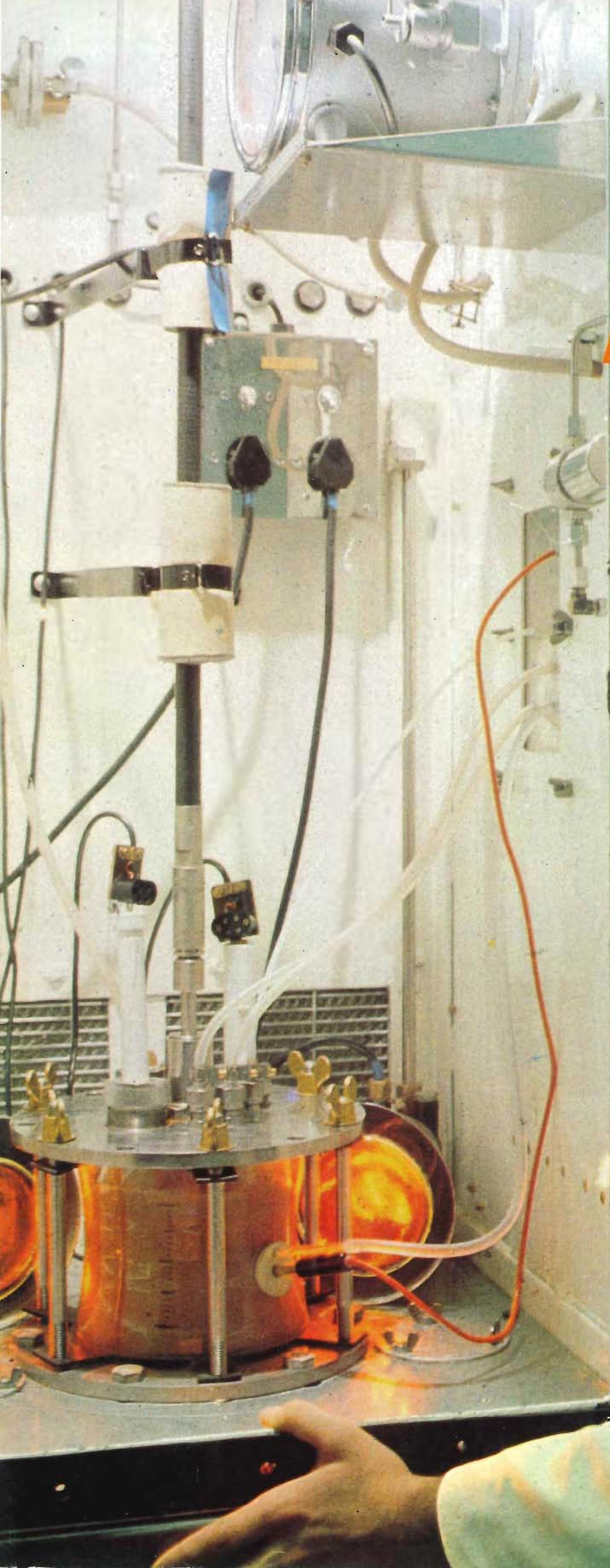


ICI

magazine

May 1969





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in this issue

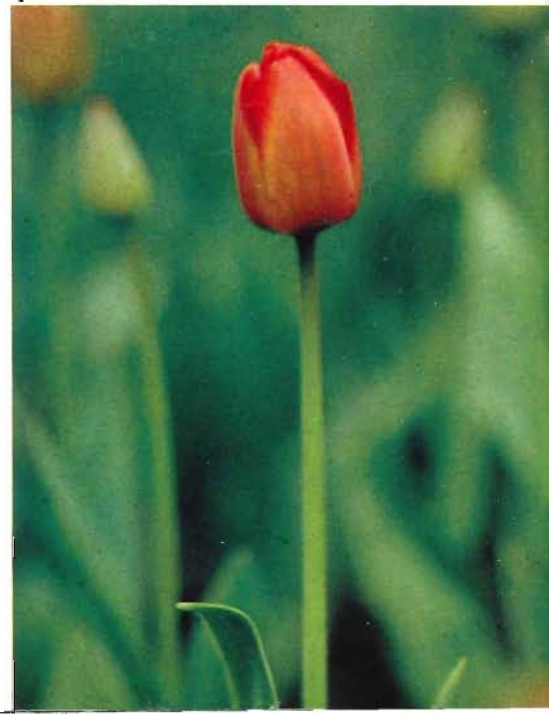
1 Inside Olefines 5, the steady hum of compressors. Outside, soaring towers and furnace chimneys, high platforms and gangways, regular maintenance. Everywhere, a power that never pauses: at key points, the people who keep that power alive. See 'They Work in Olefines 5', p. 110.

2 It takes two to three years just to build a complex chemical plant, several years longer to bring a new product to full-scale manufacture. Some of ICI's research and development people have to look even further into the future – 20 or even 30 years ahead. See page 100.

3 Every day except Wednesday, which is sacred to the god of the sea, African fishermen haul in the catch at Keta, Ghana. Enormous nets cut off half a mile of beach, take a morning to haul in. 'Going to market in Ghana,' by a VSO volunteer, is on page 106.

4 For gardeners May is a month to distrust. Percy Thrower tells you why, page 103.

4



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magazine

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people in print



Norman MacLeod, author of 'Making tomorrow happen' (page 100) is a deputy chairman of Plastics Division. He joined the then Explosives Group of ICI in 1942 from Edinburgh University, where he graduated in chemistry. Moving to Plastics Division in 1945, he was engaged in technical service and development during the extremely rapid post-war growth of plastics. From 1960 to 1962 he was

manager of the 'Butakon' plant at Wilton and on his return to Welwyn became development manager of the Division, joining the Board in July 1964. In 1967 he was seconded to Head Office as head of Research and Development Department, a job he held until his recent appointment and second return to Welwyn.

He enjoys photography, appreciates (as a true Scot) opportunities for travel on Company business, is learning to polish gemstones, and is active in local church affairs.



Robert Malpas, author of 'Polythene at Puertollano' (p. 118), is deputy chief executive of ICI (Europa). After a boyhood spent in South America, he came to England to study engineering at Durham University and on graduating with first-class honours in 1948 joined ICI at Billingham. He became engineering manager of HOC Division in 1961 and in 1963 was seconded as joint chief executive of Alcudia. After three years in Spain he joined ICI (Europa). Speaks fluent Spanish, French and Portuguese and has recently taken up golf as a 'safer game' than rugby, at which he once lost two front teeth playing for the North-east counties against the Springboks.



A chemical sales representative attached to the Manchester Sales Office, **David Hewitt** read Greats at Jesus College, Oxford, and joined ICI on graduation in 1967. Was granted a year's leave of absence to undertake voluntary service overseas, which he spent teaching Latin and English at Keta secondary school, in the Volta region of Ghana, before starting with Mond Division last September. During his time in Ghana he travelled to the Cameroons – to climb Mount Cameroon – and to Nigeria.



John Fowler, author of 'How did you get home so quickly?' joined the Technical Service Department of the former General Chemicals Division in 1958 after National Service as a flying officer in the RAF and a general science course at Manchester University. In 1962 he was seconded to Plastics Division to work on vinyls and development products, returning 18 months later to the new laboratories at Runcorn Heath to become a technical service representative for 'Cereclor'. During the last five years his job has taken him to many countries, mainly Latin America, Canada and Eastern Europe. A keen gardener, he grows cacti in particular. He also enjoys caravanning, hockey and photography.

Front cover: a miniature continuous fermenter used for biomass research in Agricultural Division (see page 101). Biomass is the protein-rich animal feedingstuff produced by the growth of micro-organisms on a hydrocarbon feedstock. The micro-organism is a bacterium and the feedstock is methane (North Sea Gas). This bacterium also needs oxygen, water, fertilizer salts, and trace elements. If this research succeeds biomass will become an important protein supplement for animals like pigs and poultry.

Photograph: George Rodger/Magnum

Back cover: fringing, Indian-style, has even caught on for beachwear. This orange bikini in Bri-Nylon stretch jersey, photographed at Kyrenia, Cyprus, is a foretaste of 1969 swimsuit fashions. By Slix, it costs about £3 10s. London stockists include Bourne & Hollingsworth, D. H. Evans, Fenwicks, John Lewis and Selfridges.

ICI Magazine for employees at home and abroad appears every month, price 2d. Members of the Company are invited to submit articles, photographs and suggestions for articles. Material offered should reflect the author's own experience, interests or ideas. Payment is made for articles or illustrations accepted. The Company does not necessarily endorse the views of contributors.

Published by Imperial Chemical Industries Limited
Imperial Chemical House, Millbank, London SW1



Editor Francis Odle

Designer Raymond E. Meylan

Printers The Kynoch Press, Birmingham

making tomo

Norman MacLeod

Diagrams:
Bruce Robertson

To the people in Research and Development at Head Office, whose job it is to look ahead on behalf of the Company as a whole, the future has several different meanings. It rarely means the next twelve months: the research for that has been done – or should have been!

On average, we spend most of our time and thought on the next five to ten years; a fact which reflects the commercial, technical and scientific needs of the Company. In a company as large and complex as ICI, for example, sales figures must be forecast up to five years ahead, to act as a guide to when, how, and why, and in what the Company should invest its money. This in turn reflects the fact that it takes two to three years just to build a complex chemical plant.

When we are developing an entirely new product, it may be up to seven years, or even longer, before a full-scale plant is erected. Not only is it essential to develop a large enough market for the product, but there may be technical problems to solve before the plant itself can be built and begins to make money.

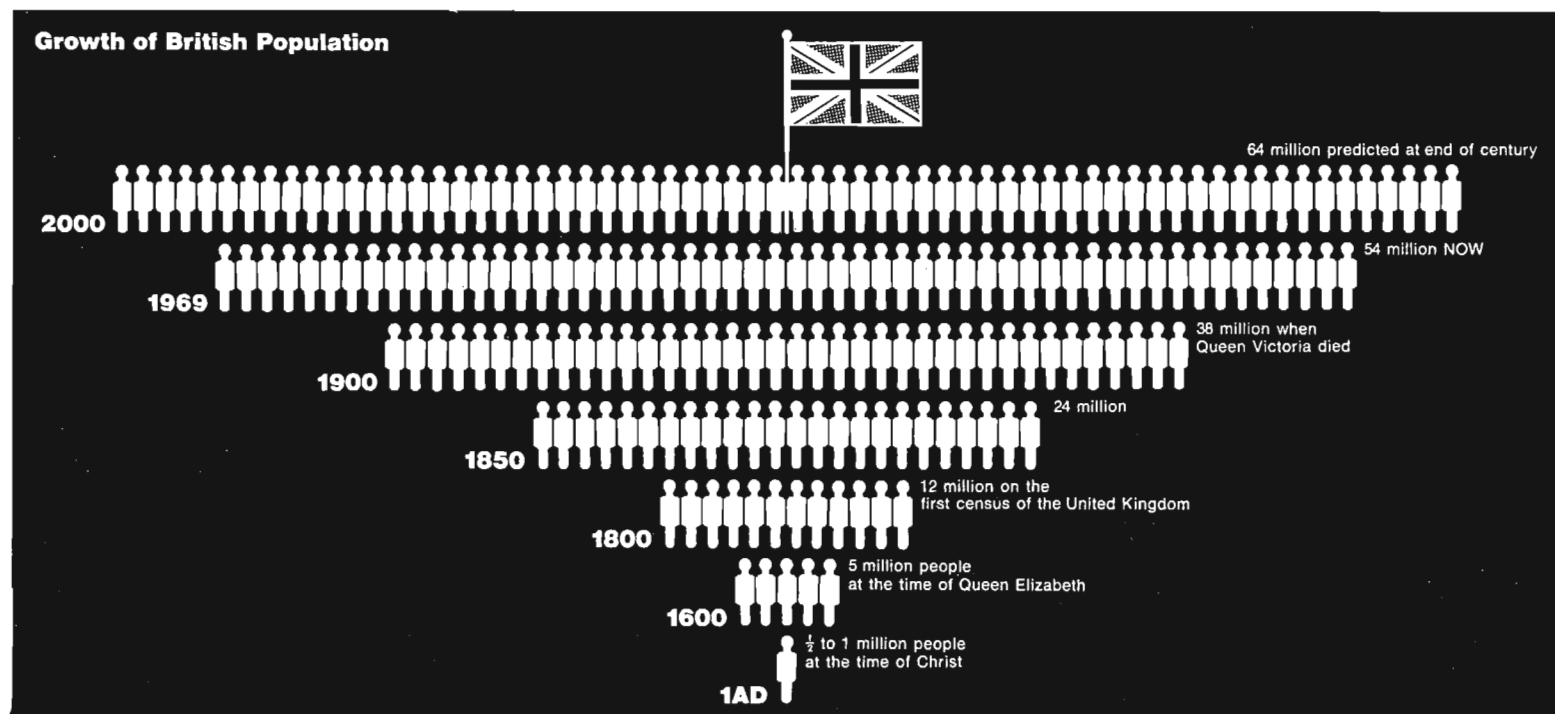
Taking things a step further, when we think about the whole future of ICI at home and abroad, we range far beyond the next ten years and look at the kind of world in which ICI will play its part 30 years ahead – in the year 2000. As a world-wide group, because ICI is growing very fast in Europe and in America as well as expanding in our traditional territories – Australia, South Africa and India – the further ahead we look, the more we take into account factors external to ICI which could affect its future growth and prosperity.

Even more important nowadays are the changes in the way we have to think about the future – particularly if we want to make that future happen, rather than wait

for it to happen. Until quite recently, anyone trying to predict the future of a large company like ICI used to concentrate on the idea that trends existed in the demand for certain products. Once identified, these trends might be affected by outside influences. It was our job to see what these influences could be and how they might affect our own manufacturing or marketing position.

Looking, for example, at the long-term growth curve for man-made fibres, this trend might have to be modified by the possibility that a major new fibre would be developed; or a new process which would radically alter the costs of production, hence the price to the public – and the demand. The researcher's job was thus to try to identify what new processes might emerge, or what new fibres might be developed either by us or by our competitors. To-day, however, in an increasingly competitive world, this method alone is no longer good enough. We not only have to recognise new needs. We must *anticipate* them.

If we as a Company are going to arrive in the future at all, we have to be ready with the results of research and development in time to gain a *competitive advantage*. This calls for new techniques of forecasting which have been worked out by ourselves (and by many other large international companies too) all over the world. For example, we have invited a number of people, including some outside ICI, to make guesses about possible future technical innovations. When we are trying to identify entirely new areas of demand, we ask ourselves, when would new types of fibres be wanted – or indeed any human needs or wants that our existing skills (or skills we could easily develop or acquire)



now happen

could satisfy. Although many of their suggestions are impractical, the occasional novel idea has proved to be well worth further study. Then again, in trying to decide the long-term future of plastics, we studied what might happen to some of the products it might replace. Suppose, for example, that in 15 or 20 years' time timber became scarce and expensive, it would be worthwhile trying to find a plastic-based substitute ready for the day when the price of timber rose high enough to justify an attack on this market.

The present can tell us a good deal about the future – especially if you study the kind of developments occurring in a number of *unrelated* sciences, to see whether or not they can be brought together. When they can, a significant breakthrough in consumer goods is often achieved. The long-playing record, invented by Dr Goldmark of Columbia Broadcasting in 1947, is a telling example. Without developments in vinyl co-polymers, giving good reproduction without 'hiss', the long-playing record would be impossible in its present form. The EVR project (featured in the February issue of the Magazine) which brings together the invention by Columbia Broadcasting Company of America of electronic-video recording with the ability of ICI and its major subsidiary, Ilford Limited, to produce the right kind of photographic film, is another.

But what about the consumer himself in thirty years' time? Without some knowledge of this we cannot work out what his demands will be and what patterns of production and marketing they may create. Our studies already show several things about the consumers of the future quite clearly. One overwhelmingly important fact is that there will be many more of them. In the UK

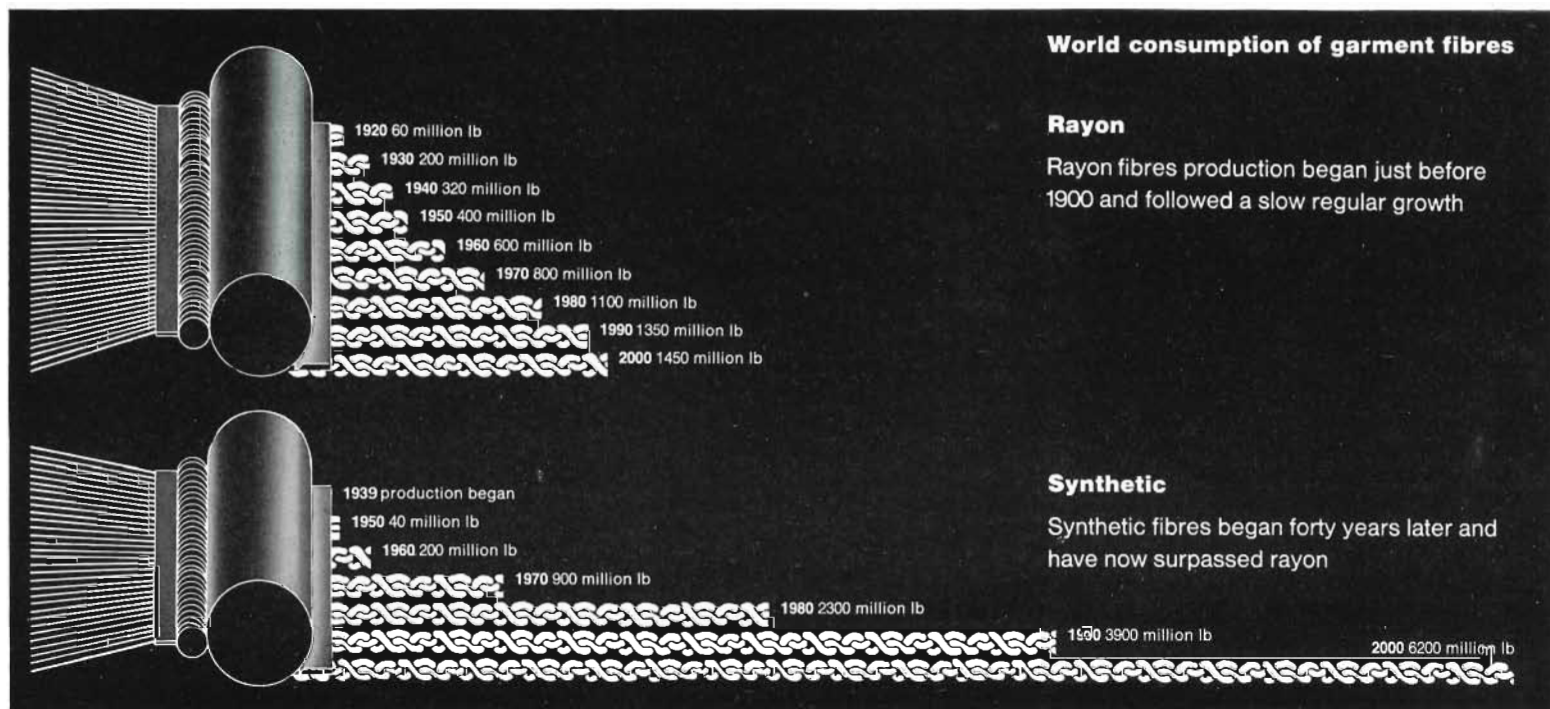
the population is predicted to increase to around 64 million, while world population is expected to increase from its present 3500 million to around 6000 million, or possibly even higher, by 2000 AD, a rate of growth fantastically greater than ever before in man's history.

Another fact is that, in the technologically-advanced areas of North America, Europe, Russia and Japan, the consumer will be much better off than he is today. But two-thirds of the world's population will be little better off than they are and many worse off, unless the rich nations tackle the problem of world poverty more generously and effectively. Continuing research and development efforts by ICI, among others, in agriculture, pharmaceuticals, pesticides, weedkillers and new ways of producing proteins (see front cover), will be of growing importance to fight starvation and poverty.

In Britain, the purchasing power of the average family will double, or possibly even treble, in the next 30 years, depending how we develop technology in this country and generally make use of our resources.

What are now seen as wants will tend to become needs for a much higher proportion of the population. One major demand of society will be for increased health services, not just to cure disease, but to keep the human body at a better level of health for a longer life span. People are also likely to demand greater safety on the roads, in the air, at work and in the home.

Nor should we ignore what is *not* likely to change very much. At least 80 per cent of the buildings now standing will still be there by the turn of the century. The motor car will undergo further evolution and improvement and may even move away from petrol as the source of energy, but it will still continue to be the



making tomorrow happen


main method of personal transport. House designs will not differ all that much from what we know today. This is an area in which conservatism persists. Chemical plants will still need pipelines, vessels, and pumps and will not be changed dramatically, though improved instrumentation, automatic devices and computer control

will undoubtedly play a very much bigger part in their design. The people of the future will have more leisure, as well as more money. There will be a big growth in leisure pursuits, but how that leisure will be used may well depend on the choice made by the people in the circumstances. We tend to think of a shorter working week, but that may not be the answer. Instead, we may see a shorter working life; a longer retirement; or a shorter working year, with a longer holiday rather than a shorter working week. We do not expect them to agree to work a 20-hour week or a 30-hour week just by reducing their daily hours. They might do it by decreasing the numbers of days worked in a week and having a longer weekend.

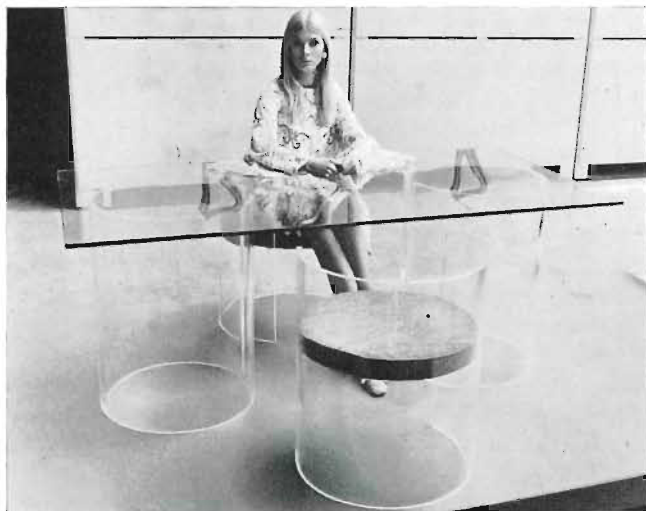
In leisure as a whole, there are big and growing opportunities for ICI. Nylon and Terylene fibres in existing and new forms will continue to contribute to the production of quickly-washed, quick-drying clothes which are also light in weight. This gives people a chance to express themselves in their clothes in design and colour, in garments made from our basic fibres. Nor should we forget that by 2000 AD nearly 16 per cent of the population (11.7 million) with leisure will be over the age of 60. Lightweight clothing, lightweight household objects, gardening tools, etc., will be very much in demand.

There is a negative side. Although the growing power of the computer to store knowledge about many aspects of an individual's life and history is recognised as being in some cases beneficial, misuse of this power would be an unwarranted interference with the privacy of the individual. For my own part, I believe that society must be prepared to resist such misuse.

Another prospect also repels. The use of new drugs, which might be developed and might have the effect of enabling people's minds to be conditioned, would have to be rigidly controlled. We take measures to control certain drugs which, on balance, have a bad effect on people—such as heroin. We may have to protect society from the misuse of new technological developments in the same way.

Technology and the efforts of industry have enabled millions of people to enjoy a higher quality of living. In the final analysis it is people themselves, as individuals, as communities, and as nations, who will influence whether or not the products of industry will be used for good or ill. 

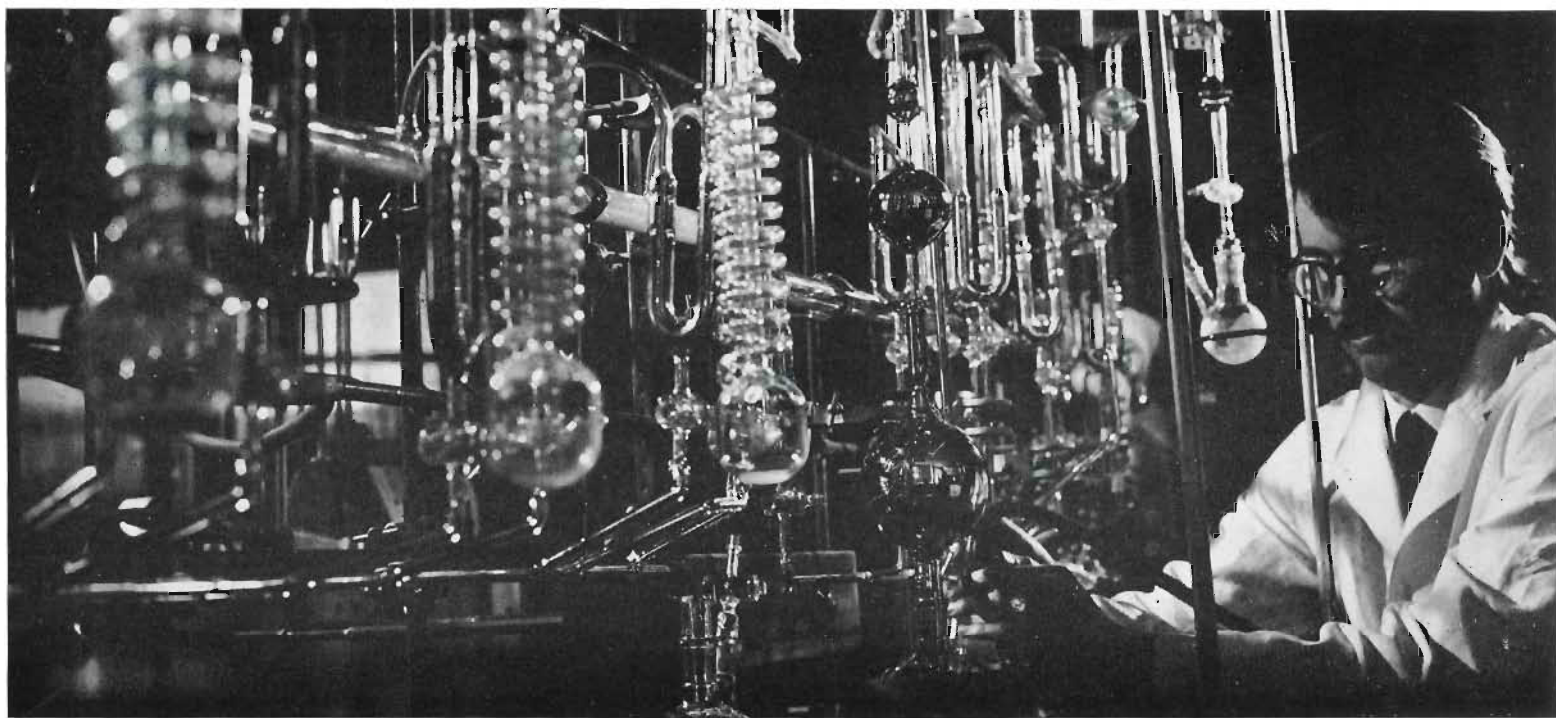
**Tomorrow's
furniture?**
Dining chairs in
Perspex,
table with Perspex
supports, glass top



**Tomorrow's
anti-icing ship's
stay? Smooth,
'Alkathene'-
sheathed 'Parafil'
offers little 'grip',
stays flexible,
should clear itself
as ship vibrates**



**Tomorrow's
new catalyst?**
Equipment at
ICI's Petro-
chemical and
Polymer
Laboratory allows
safe handling of
material which
explodes even
at very low
temperatures



May in your garden

Percy Thrower

May is a month I have learned to distrust. So often we have fine warm days in the early part – only to get severe night frosts before the month is out. And these late frosts can do untold damage to fruit blossom, trees, shrubs and plants of all kinds. You should not, therefore, be tempted to plant out half-hardy plants until the end of the month, or even until the first week in June if you live in the north. Even then the plants must be gradually hardened off before they are subjected to outside conditions.

At the Gardening Centre at Syon Park (jointly owned by ICI and the Duke of Northumberland) it is tulip time, with more than 50,000 in different kinds and varieties at their best. Camellias too are in flower and each day we see the rhododendrons, azaleas and other shrubs getting brighter with richly-coloured flowers. In London also this month, not far

from the Gardening Centre, there will be the Chelsea Flower Show, which is an important event in the gardening calendar of Britain.

May is the time to take yet another look at the lawn. If broad-leaved weeds such as daisies, dandelions, plantains and buttercups are allowed to grow with the grass, the lawn cannot look its best. It is now, when both the grass and the weeds are growing fast, that you get the best results with selective weed-killers. I still think you get the best results by feeding with an organic-based all-purpose fertilizer and then three weeks later, when the grass and weeds are getting the benefit of the fertilizer, spraying with a selective weedkiller. But this is two operations, which take time.

Now that we have ICI's Lawn 'Plus', a fertilizer with selective weedkiller added, we can feed and weed in one operation. Leave the lawn unmown for three or four days before spraying with selective weedkillers, such as 'Verdone', or before applying Lawn 'Plus' – and also leave it for another three or four days after the treatment before being mown. Fertilizer must be spread evenly over the surface, so for large areas use a spreader. Lawn mowings taken off the lawn during the two mowings after treatment must be put on to the compost heap where they can stay up to six months before being used. Never use them for mulching round roses, shrubs or in other parts of the garden.


With the warmer weather greenfly increases rapidly. If you look into the young tips of the rose shoots, you may see the green aphids clustered together, sucking the sap from the young leaves. Spray them with 'Abol-X'. I prefer to mix this with water, according to the instructions, and add General Garden Fungicide to make a combined spray. This not only kills the greenfly but helps keep mildew and black spot in check.



Outdoor-flowering chrysanthemums can be planted out now, and they like a rich soil. If manure or garden compost has been dug in, then Double Organic 'Plus' can be sprinkled over the surface before planting, a handful to each square yard. I put the canes in first and then plant one to each cane. The canes need to be two feet apart with three feet between the rows. After planting, tie each plant securely to the cane so that it will not be broken off by strong winds, or damaged by animals. If the soil is dry, water immediately after planting.

Around the middle of the month it's time to sow runner beans, but I prefer to make two sowings, to provide a succession of pickings. So I make the first sowing in pots, one bean to each three-inch pot, during the first week of the month. These are then gradually hardened off and planted out in the last week in May or the first week in June. The second sowing I make in the open ground towards the end of the month. I put bean sticks in first and sow one bean to each pole. And I always sow some extra seed at one end of the row, so that where there are failures these can be transplanted to fill the gaps. Streamline is still one of the best varieties for general purpose but during the last two years I have also grown Twentyone, and this too is a good runner bean.

Sweet corn is a great favourite of our family and here again I make two sowings – the first in pots, one seed in each three-inch pot, during the early part of the month; the second sowing outside around the middle of the month. The pollen-bearing part of the plants are produced at the top and the pollen falls on to the stigma of the cobs lower down. They pollinate much better if they are planted in blocks rather than single rows.

In the greenhouse the tomatoes are coming into flower. You often get what is in gardening terms a 'dry set' on the first truss: tiny pea-like fruits which fail to develop. This can be overcome by spraying the plants overhead with water at mid-day on sunny days. It helps to pollinate the flowers and creates ideal conditions for the pollen grain to grow down the style and to fertilize the fruit. Cucumber seed can be sown in the greenhouse early in the month and the plants should be ready for planting in a frame during the first week in June. There are the F.1 hybrid cucumbers available now but I still rely mainly on the old variety, Improved Telegraph. The seeds will need a minimum temperature of 60–65°F for germination and the seedlings should be planted out in a warm, enclosed frame. 

Rhododendrons, azaleas and very many other shrubs are flowering now at the Gardening Centre, Syon Park. So also are the tulips shown above, right: more than 50,000 of them



how did you get home so quickly?

John Fowler

Drawings: Jim Morton

'There are four buses. My companions
try to find out which bus is which'



'It must be marvellous to travel like you.'

'Lucky you, visiting all those wonderful places.'

'Wish I could come with you.'

Overseas visiting as part of one's job can have its lighter, more relaxed moments, but they are all too rare. Let the would-be wanderer consider the following incident: 'Your flight is confirmed, please be at the airport one hour before flight departure. Have a pleasant journey.'

Four days later, my week's visit over, I arrive with ample time to spare at Belgrade Airport.

'Thank you for coming. Your plane to Bucharest should be here in an hour. Please come back to Yugoslavia again.'

'Thank you for your efficient arrangements, I hope to come back next year.'

We shake hands warmly.

'Goodbye.'

'Goodbye.'

I check in. My case is carefully tagged and disappears. A few moments for reflection. One day in Bucharest and then London tomorrow night, home the following morning. I remember that dinars are not exportable and head towards the exchange counter. An arriving Air France steward changes some francs. Then it is my turn . . .

'Dollars?'

'No. All gone.'

'Marks?'

'No.'

'Swiss francs?'

'No.'

'Schillings? Guilders?'

'No. French francs.'

'I'll take them.'

That difficulty surmounted, I await the plane. It arrives almost on time. As soon as the passengers are in the terminal the tanker approaches for the refuelling operation. Only four passengers are in transit to Bucharest. I am the sole traveller from Belgrade. Departure time comes – and goes. We wait.

'Owing to weather conditions the flight to Bucharest is delayed. There will be a further announcement at nineteen hundred hours.' There is, but only to announce there will be another at twenty hundred. At twenty-thirty the airline ground manager appears.

'We cannot depart tonight. We have booked you into a hotel for the night. The plane will depart tomorrow at 0-six hundred. Please be here at 0-five hundred. A bus will be coming shortly.'

'What about our luggage?'

Three porters manage to retrieve my case in little more than half-an-hour. It is soaking wet but that goes unexplained. The tags are removed. I go back clutching my French francs to the Exchange Office. No arguments this time. My dinars rapidly reappear.

There are four buses outside. My four companions – one French, one Swiss, one Italian and one Czech – try to find out which bus is which. The porters only speak

Serbian. Nevertheless, we find the right one. By ten we are in the hotel where the airline stands us dinner.

'Can I have a call at four-fifteen?'

'Certainly, Sir.'

And so to bed. I wake up an hour early to ensure they ring me at the appointed time. When the telephone rings I feel like breaking it. No breakfast but the bus is ready when we emerge. My fellow passengers crawl aboard. At the Airport Terminal we are the sole occupants. Shortly afterwards the ground staff arrive – still smiling. The tickets are rechecked, the baggage is re-tagged. Soon be off.

At 6.30 am the aircraft Captain gathers us together: 'Owing to slush on the runway at Bucharest the plane must be lightened. We have to pump-out five tons of fuel we put in last night. They say it will only take twenty minutes – I don't believe it.'

The plane is towed away and the Captain's fears are fully justified – it takes two hours. At least we can watch the end of the operation – by 8.30 am it is full daylight. I dash off to change my remaining dinars once again. No trouble this time – supplies have been replenished.

'Dollars?'

'Yes.'

When we climb aboard at nine o'clock the terminal is full of people waiting for the plane on its return from Bucharest. They have a three-hour wait at least.

We fly eastwards and the clouds get thicker underneath. The Captain reappears in shirt sleeves and we gather round in the middle of the plane.

'My companions depart for Vienna, Paris and Geneva. The sleet falls solidly . . .'



New tickets are issued. New tags are put on the cases again. The customs officer examines my passport for the fourth time. He is not going to put another stamp on it! On to the plane and this time the journey is uneventful. At Zurich it is sleeting.

'I want to go to Manchester via London.'

'Certainly, Sir. The London plane left ten minutes ago – the next one is in five hours, we'll book you on that.'

My three remaining travelling companions depart for Vienna, Paris and Geneva. The sleet falls solidly for the whole five hours. At last . . .

'Will passengers for London board the aircraft through Gate 2.'

At 8 pm I'm back at Heathrow and check in for the Manchester flight. The new terminal has opened during the week and there is plenty of room. At nine we walk along the corridors to the plane. All aboard, but the door stays open.

'We apologise for the delay but the flight documents have got stuck in the pneumatic system.'

Half-an-hour later a messenger pedals up to the plane on a bicycle with the offending documents. At 10.30 we arrive in Manchester where – what else? – it is raining. My wife greets me.

'Hello, how did you get home so quickly?'

'Well, it's a long story.'

That was last November, now it is early March. I must close the story anyway as the wheels are going down for the landing at Nassau. Some people never learn. Perhaps you would like to swop places? 🚲



'Breakfast with a glass of champagne on the house to wash it down'

'Well, it was clear when we left Belgrade and the snow has been removed from the runway. Unfortunately, during the time it has taken to fly here it has become too foggy to land. We'll circle round for thirty minutes to see if it clears. Since the fuel was taken out we can't stay longer. We could get to Constanza on the Black Sea but you would be miles from Bucharest and we could not pick up anyone.'

Our Italian traveller has to join a ship in Constanza. His eyes light up briefly, but when the situation is explained he becomes resigned to his fate and slumps back into his seat.

'Would you like some breakfast, Sir?'

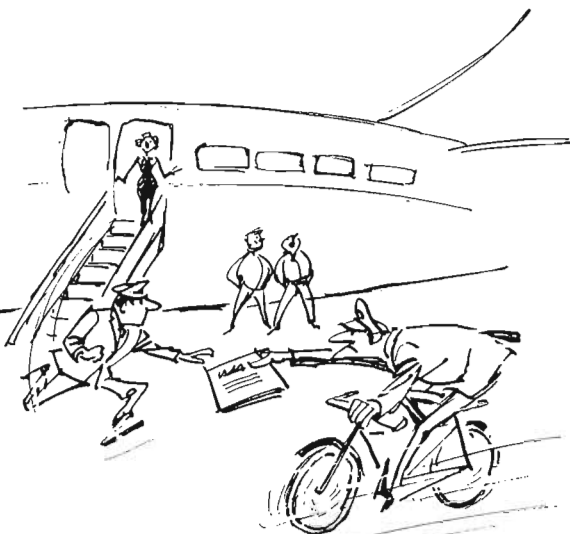
'I would, especially with a glass of champagne on the house to wash it down.' The Captain again . . .

'We are returning to Belgrade.'

Belgrade Airport once more. The ground staff are still smiling – but not quite so brightly. Back through customs. The baggage is rescued again and the tags removed.

'There are no flights to Bucharest until Monday.'

'I'll continue with the plane to Zurich.'



'A messenger pedals up with the offending documents'

going to market in Ghana

Photographs: author

'Yevor (white man), you are going to market? Get in please,' was the Ghanaian taxi-drivers' usual question when they stopped to add David Hewitt to their already considerable load. Now a chemical sales representative with Mond Division, he recently spent a year teaching Latin and English at Keta secondary school in the Volta region of Ghana.

The speed of progress in Ghana is obvious and few people now, except the old men, wear traditional clothes for everyday use. Television and radio, 'soul', films and the mini-skirt are all much in evidence. Yet the traditional way of life, of the family unit grouped around the compound, the simple market society, still goes on



'David, Wayso. You are welcome. 'Yo Martin, aphwa? 'Eh, miaphor. I am well.' After these conventional greetings in Ewe, which were as much of the language as I could master, Martin and I settled down by his stall to talk about all that had happened since I last came to market. For some time Martin, who was a shoemaker and, as a war veteran, a lover of all things English, had promised to invite us to Sunday lunch for an Ewe speciality, cat soup. However the date was postponed several times because, as he put it, he had not been able to catch the particular cat he was after. I have to admit that I was hoping the cat would continue to evade capture. But caught it eventually was, and the resulting stew, heavily laced with red pepper, like all Ghanaian food, was very tasty – once one's initial squeamishness had subsided.

Invitations to dinner were quite common and one evening when I arrived to eat with another friend, Robert, who had assumed the task of introducing me to Ghanaian food, he announced that this night we were going to *chop fu-fu* (chop being the West African pidgin for eat). *Fu-fu* can be prepared from a variety of sources such as yam, a large fibrous root, or plantains, sweeter and bigger than bananas, and it involves a lot more work than the average European housewife would be likely to put in on the evening meal.

First you get out the pestle and mortar and then pound slices of the raw material for at least ten minutes – a joint effort with several pounders brings quicker results. At the end you have a white, gluey substance with the consistency of putty, and the meal may begin. Your host gives you two large lumps of *fu-fu* in your bowl which you dip into the soup which has been simmering over the charcoal fire. The *fu-fu* has by this time lost all its original taste, but it is a good way of scooping up the stew. You must always eat with the right hand and not the left, which it is very bad etiquette to use in public, even to wave or receive change.

Robert would usually offer me a glass of *akpeteshie* before dinner, a spirit distilled from palm wine. Palm wine itself is pretty strong, depending on whether the palm is tapped early in the day, as connoisseurs insist, or later when the wine gets progressively rougher, but *akpeteshie* is almost pure spirit and I often pleaded a weak European stomach when offered it; that is after the time I attended a wake one Sunday afternoon. There, when the singing and dancing were over, invitations to take a glass of *akpeteshie* were extended to us all. Previously I had added orange, when there was at least

Off to market – in a mammy-wagon called 'Comfort'. Wares the market-mammies carry range from high-smelling fish to over-active poultry. It's a bumpy ride, too. Right: mischief among the matting



going to market in Ghana

a token resemblance to a gin and orange, but now it was neat. To decline is an insult to the host's hospitality and there is nothing for it but to down the triple measure in one gulp, though custom does demand that a libation is poured to the earth first, which I tried to make as generous as possible.

Since the town of Keta is almost surrounded by water, fishing is the main occupation. The nets are taken a hundred yards out to sea on surf boats to cut off half a mile of beach, then hauled in by two teams at opposite ends of the beach. Gradually as they pull in the nets, the teams converge, straining in time to a two-toned gong. The whole operation takes as much as half a day, and after attempting only a few minutes on the rope, I knew it was hard work.

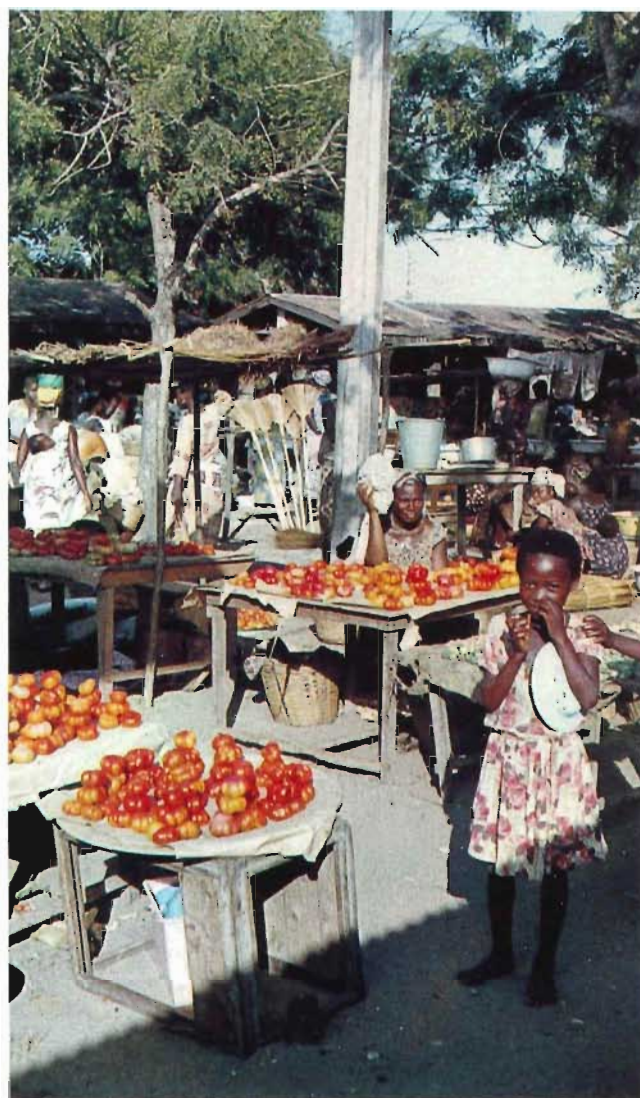
The men fish every day except Wednesday, which is sacred to the god of the sea, whose displeasure is obvious whenever the catch is bad. Then, to placate him, the fetish priest is employed and may prescribe the sacrifice of a cow, which is driven into the sea. Human sacrifice, too, traditionally of a man with a physical imperfection, used also to happen at these times. The happiness and prosperity of the whole community is thought to depend on the good-will of the gods, and there is a yearly purification of the village, announced in advance so that all except the priest and his followers may be indoors during the rites. Yet I can recollect floating on the same sea at night, feeling both its calm and power as the moon rose in the east, casting silver-pink beams over the surface of the waves.

While the men fish, their wives – a man may have more than one, each with her own compound and

Far right: pounding 'fu-fu', a white gluey substance with the texture of putty, used to scoop up stew

Right: small girl and lots of tomatoes

Below: market day in Keta: bags, baskets, bright colours in the sharp African light



children living with her – collect the catch from the beach and sell it in the market. Every fourth day, year-in, year-out, Keta market is held and from early morning these market-mammies wait at the roadside for transport to market.

The three types of transport, in descending order of comfort, are shared taxi, minibus and mammy wagon. The last, as its name suggests, is the preserve of the market-mammies and their goods, and is only to be used by other travellers as a last resort. You are liable to find yourself alternately cursing and blessing the mammy sitting next to you, depending on whether you are squashed or cushioned at each pot-hole by her ample form. Also, mammies' wares may range from high-smelling fish to over-active poultry.

Whichever way you travel, timing is likely to be erratic. No vehicle will leave the lorry-park (a primitive bus-station) until it is full, even if this takes all day. Before I learnt better, I used to ask the driver or his mate who collects the fares, and spends his time defying death on the running board, 'When are we going?' To which the initial answer was an all-purpose 'Yes!' Pressing him further, I was told, 'Soon', which can mean anything from immediately to tomorrow. Once on the move you breathe a sigh of relief, only to find, that fifty yards down the road, there is yet another passenger to be fitted in, with luggage: the driver works on the principle that there is always room for one more.

Miraculously, most of the lorries do eventually arrive at the market. Then it's chaos as the market women descend and, like as not, argue over how many packages are to be charged, in which case everyone else joins in. But it is all very good-humoured and after the hazards of the journey you appreciate the mottoes which every vehicle has painted on it, such as 'The Lord is My Shepherd', 'Spera in Deo', or even 'Don't Ask Me Why!'

Once in the market, the chaos of the road is all resolved. In one part the fruit stalls, in another onions, pepper-sellers, sugar, fish, meat, palm oil for cooking, cloth and even fertility dolls and ju-ju rings to ward off evil. Behind every stall stands a mammy, brightly dressed in cloth and head-scarf, with one or more children playing around her, feeding at the breast or sleeping on her back.

As I walked around, all the little ones would start to chant and jig in Ewe, 'White man, white man, black beard', a rhyme which every child learns and which seems to originate from the first (bearded) missionaries in the region. Once or twice I caused fits of laughter by trying to imitate them, and often I stopped to feel a pricking sensation on my legs, and found some toddler pulling at the hairs, out of sheer curiosity – Europeans have much hairier legs than Africans.

Buying anything could be a lengthy ritual – there are elaborate rules for bargaining – but after the oranges or whatever have been placed in your bag, and Mammy has delved inside the folds of her cloth for the change which she keeps tied in a knot, in the absence of pockets, she leans over, and drops in a couple more as a gift, saying 'I dash you small'. Then she giggles or laughs as if to say 'Keep it between the two of us.' (C)



they work in

Photographs: George Rodger/Magnum

Earlier this year Olefines Plant No 5 at HOC Division's Wilton site went on stream so smoothly that within eleven days it was turning out all olefine products to specification – key materials in so many of the Company's synthetic fibres, plastics, and specialised rubbers. But what lies behind the words 'on stream'? What kind of thinking, planning, working round the clock? And what is it like to work in the biggest single-stream naphtha cracker in the world – where everything is on a giant scale: pipes, columns and furnaces, compressors and volumes of gas? Eight men in Olefines 5 now speak for themselves

What happens – four main operations:
cracking, cooling, compression and separation



CRACKING – conversion of raw naphtha into olefine gases by heating it for about one second at 800 degrees Centigrade in the furnaces



COOLING – of the gases down to the temperature of the surrounding air. This enables the liquid products – petrol and fuel oil – to be recovered. Cooling-down generates by-product steam at a pressure of 1800 lb per square inch



COMPRESSION – of remaining gas to 500 lb per square inch, followed by more cooling through a giant refrigerating system (which also uses compressors) down to minus 140 degrees Centigrade. Compressors range from 10,000 hp up to 36,000 hp. They are driven by steam turbines which use the by-product steam from the cracking section, plus other steam generated in two oil-fired boilers



SEPARATION – this cooled mixture of olefine gases is now separated into ethylene, propylene and a mixed butylene/butadiene stream

Olefines 5

178 tons an hour – 365 days a year

'On Olefines 1,' says Bert Booker, assistant works manager (seen right of picture with shift manager Harry Blagg) who oversees all production matters, 'the naphtha feed rate was 20 tons an hour at the most. On this plant the top rate is 178 tons an hour. Planning for the start-up was a very big job. Our planning manager made quite a difference. With four estimators, he spent a year planning the workload. And he did a lot to link up the "spheres of influence" of each manager and engineer.'

'A large scale model of the plant was built, and this was very useful in making sure the equipment could easily be "got at", both for running the process and for regular maintenance. We also used it to draw up equipment inspection tours for the process operators.'

We bought a flow sheet

'The big thing that came out on this job,' says Len Pearson, section manager (at model, right, with project engineer George Barker on his left), 'was the value of teamwork and planning. Originally there was a small project team: the project manager from Technical Department, the project engineer and a production man (myself). Later more and more people became involved, first our opposite numbers in the Lummus Co. Ltd, our design and construction contractor, then ICI engineering and operating staff.'

'In principle, we bought a flow sheet and worked with Lummus to turn that flow sheet into reality. First we set out the specification and agreed on it, then we agreed on the line diagrams. Next, we had to agree on how to get a workable plant at reasonable cost. When the contractor had finished building the plant we took it over and tried out as much as we could as we went along – the steam boilers, for example, and most of the distillation towers. It was a build-up towards a start-up.'

George Barker has been with ICI for nearly 20 years. As project engineer of No 5 he was ICI's agent, specifying and interpreting all engineering requirements to the contractor and approving all expenditure.

'Over 50 project and specialist design staff from Engineering Department contributed to this work,' he explains, 'about 12 of them full time. Other process, maintenance and ICI construction staff, provided "know-how". It was my job to co-ordinate the engineering activities of Lummus and ICI so that when the production people took over they could get away smoothly with their commissioning programme. Then I moved on to the works for the start-up, to deal with the problems that arise at this stage.'

Dials for decisions

'When I started this job I thought the control room was vast! I said to myself, "We could play cricket here!"'

Panel operator Jack Jones (seen at work with, centre, Alec Smithson, instrument assistant foreman, and right, David MacMahon, plant manager), and his colleague John Harris look after a control room which measures 24 ft by 88 ft and contains about 800 dials and indicators. They live in a world of figures which represent gigantic facts. 'You have to be on your toes all the time. You could be at one end of the room for a few minutes and one of the pressures might suddenly alter. If you didn't get back quickly, or direct someone outside to act, something could happen that might take two or three hours to put right. We watch all the panels, mainly for temperatures, pressures and levels, at 500 points.'

'Altogether, we are in touch with 20 people in the plant. Everyone carries a numbered "bleeper". When we dial someone's number, this bleeper starts going and he then calls us from the nearest telephone.'



they work in Olefines 5

A better start-up

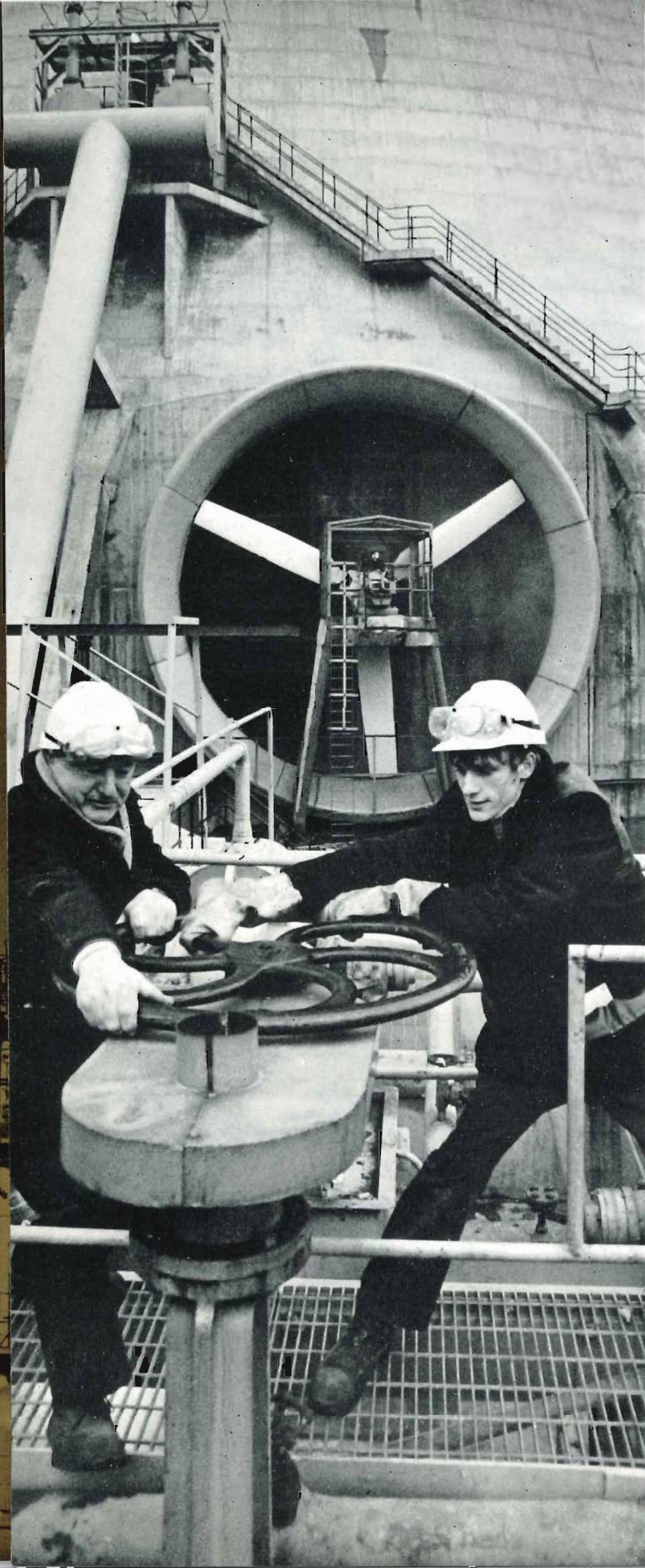
In the giant shadow of the world's biggest water-cooler, dwarfed even by one of its fans, foreman Tony Murray, left, and process worker Ray Barratt close a valve. Cooler stands 200 ft high, measures 250 ft across, circulates $4\frac{1}{2}$ million gallons of cooling water every hour. It contains 1000 tons of wood.

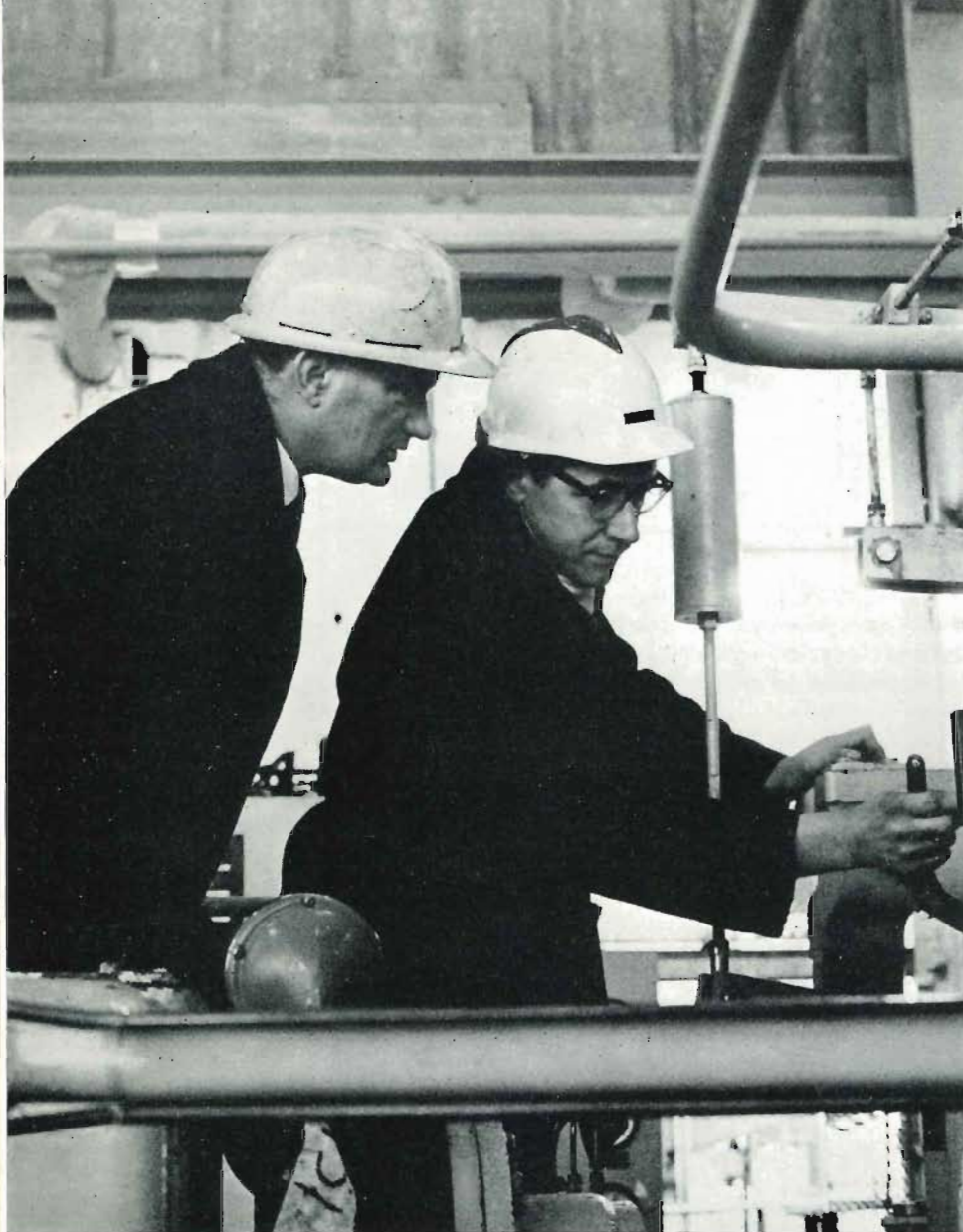
One of the shift foremen, a veteran of Olefine Works, Tony Murray, looks after the labour force and the operation of the plant during his shift. 'No 5 plant had a better start-up than the others. Two things did it: teamwork and forethought, based on things that had happened both in other companies and in ICI. People seeing the plant for the first time must get an impression of overpowering size. But as you work the plant, it seems to get smaller. It's well-laid-out, there's more breathing-space — you can just walk in and get on with the job.'

Keeping up the pressure

'We have some 70,000 horse-power to cope with,' explains Mike Boycott, works engineer (below) who with Bert Booker shares overall responsibility for Olefines 5 and the adjacent ethylene oxide and butadiene plants, 'and one of my interests was the installation and operation of all the compressors. They had to be lined up, tested out and made vibration-free. We spent a lot of money getting really good machines and have taken extra care to see that they cannot damage themselves in any emergency. Our process-gas compressor has 28 "trips" — special devices — for this purpose. If the oil pressure falls, the compressor stops itself; if it goes too fast, it also stops, and so on.

'We use two independent oil pumping systems to lubricate these compressors, one driven by steam and the other by electricity. If either should fail, a third, reserve electrical system can take over at once.'





The heart of the plant

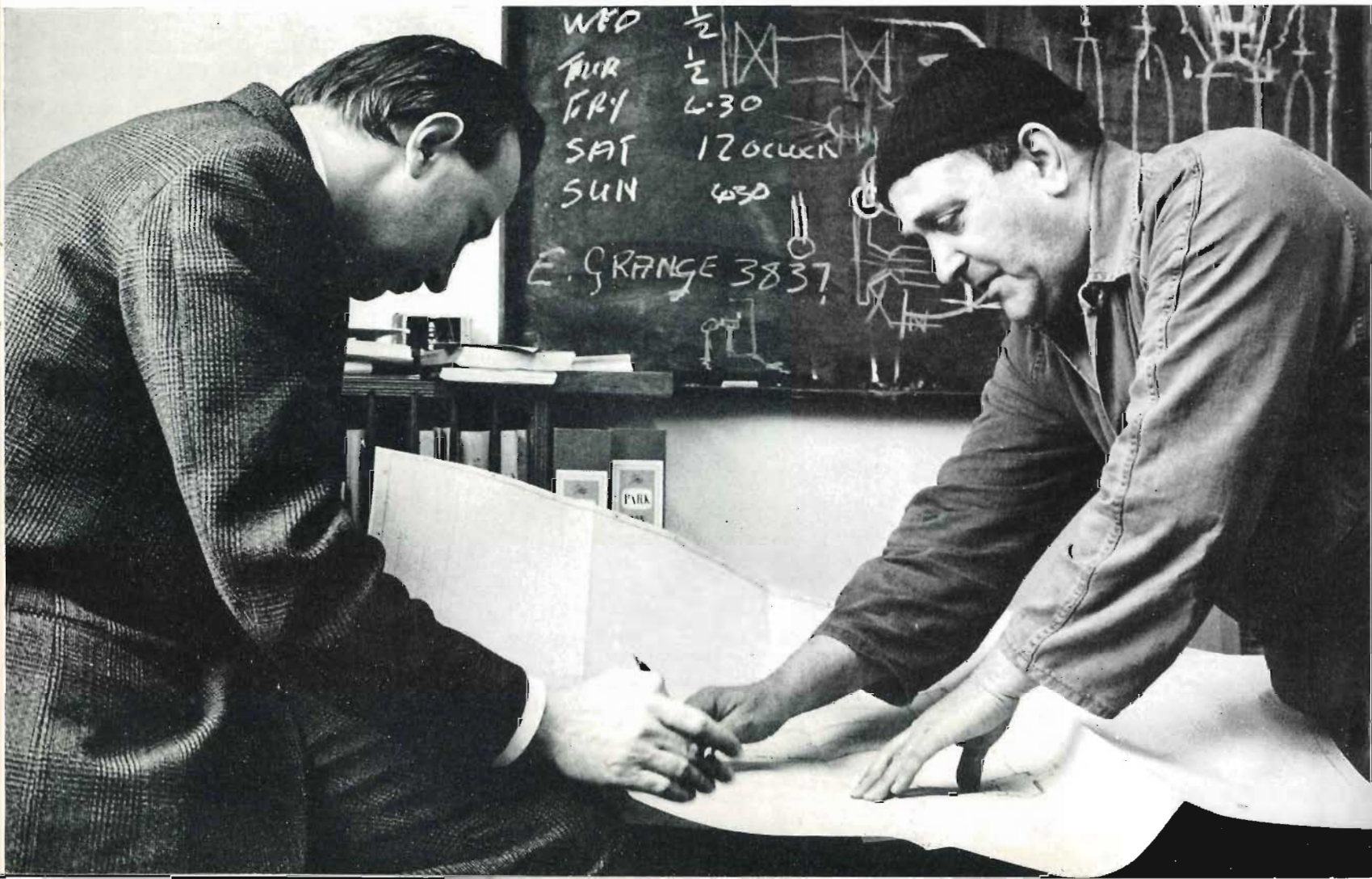
Olefines 5 has the largest mechanical-drive turbines and compressors ever installed in the chemical industry. With no spare installations, these machines must run smoothly all the year round. 'The main compressor,' stresses Frank Andrews, compressor section engineer (left, with Norman Fryatt, compression assistant foreman), 'is the heart of the plant. If that stops, everything stops. So we check in detail all the equipment needed to keep it going without a fault – all 36,000 horse-power of it.'

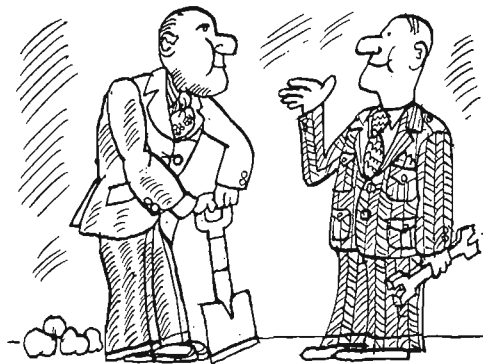
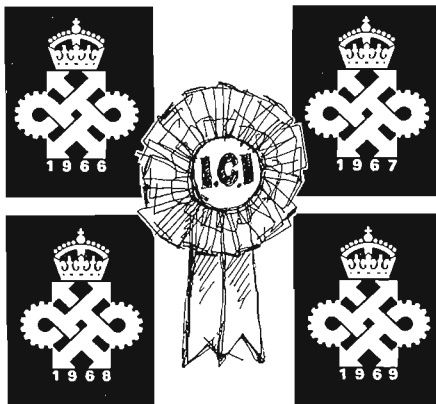
'The tremendous increase in the scale of chemical operations in the last ten years has brought into being almost a new breed of turbine, with higher speeds and greater horse-power, for which there just weren't the applications in this industry before. And we are getting the benefit now of the new alloys developed through aero-engine research and also from advanced space research.'

'In my career I have worked on the TSR 2 engines and also on the prototype Concorde engine, but I find industrial projects like this just as interesting. Before start-up there were several months when we worked 100 hours a week. But I was sure the machines would run, because we had spent so much effort on them. Naturally it's very satisfying to have good results so soon. When I found that modifications I had suggested were doing a good job, I was delighted.'

Big machines – fine limits

As workshops fitter, Len Crabbe (below, right, with section engineer Bob Clark), who has worked on several other HOC olefine plants, has been directly concerned with getting the compressors going: lining up the machines, fitting equipment to test vibration, and so on. 'You're working on a big scale but to fine limits all the time – not always easy when construction is going on all round you. Cleanliness is the big thing we always have to watch, as well as understanding the whole compressor layout. Ever since I joined the Division in 1954 fitters have kept abreast of the continual development in compression equipment – right from the early reciprocators to the big centrifugals. So we are familiar with technical change – and we intend to remain so.'





ICI wins fourth Queen's Award

For the fourth year running ICI has won the Queen's Award to Industry – for both technological innovation and for export achievement. Three Divisions, Dyestuffs, Paints and Pharmaceuticals received the 1969 award for technological innovation, while Dyestuffs and Pharmaceuticals also gained it for export achievement. An award was also won by Bexford Ltd, an ICI subsidiary, for technological innovation in photographic film casting manufacture.

Dyestuffs Division won their technological award for inventing and developing a new hydrogenation process used to make aniline, a key intermediate in the manufacture of dyestuffs, polyurethane chemicals, and rubber chemicals. The new process also helps other manufacturing activities. In 1968, the Division's exports at some £45m were 28 per cent higher than in 1967. More than 85 per cent of their 'Procion' fibre-reactive dyes are exported.

'Everyone in Dyestuffs Division,' says Dr C. R. Mavin, Division chairman, in a special message, 'can feel justly proud at the Division's great achievement in winning another "double" Queen's Award to Industry. Your team spirit, technical know-how, professional ability and hard work have earned for us once again the leading industrial award of the land.'

The Paints Division award, their first, was for technological innovation in non-aqueous polymer dispersions, an advance which makes possible new processes for producing polymers and new agents for dispersing pigments. Patent licences and know-how have been sold to three leading American companies.

'The first Queen's Award to Paints Division,' writes Mr P. Overbury, chairman of the Division, 'which indeed is the first to a paint company for technological innovation, is a fine tribute to our research. "Dispersymer" technology is a major advance with a potential not yet fully realised, and is a striking instance of our leadership in the paint industry.'

This is the fourth Queen's Award for exports won by Pharmaceuticals Division.

'Last year,' writes Mr R. G. Hoare, Division chairman, 'Pharmaceuticals Division celebrated the "hat trick" by again being honoured with a Queen's Award to Industry for its export performance. This year the Division has achieved

the "double" and I am proud that the efforts of all in this Division have been recognised by an award for export achievement and technological innovation. In the twelve months ending July 31, 1968, Division exports rose by more than 25 per cent over the year before – and from 1965–68 the compound increase was 21 per cent each year.

'The citation for technological innovation was for the discovery and development of drugs used in the treatment of heart disease, and it seems clear that it is 'Atromid' and 'Inderal' which have been honoured. I am particularly proud that Pharmaceuticals Division is one of only four organisations in the UK which have been honoured for four years in succession, and I know that all in the Division share my pride in this distinction.'

America honours pioneer in plastics research

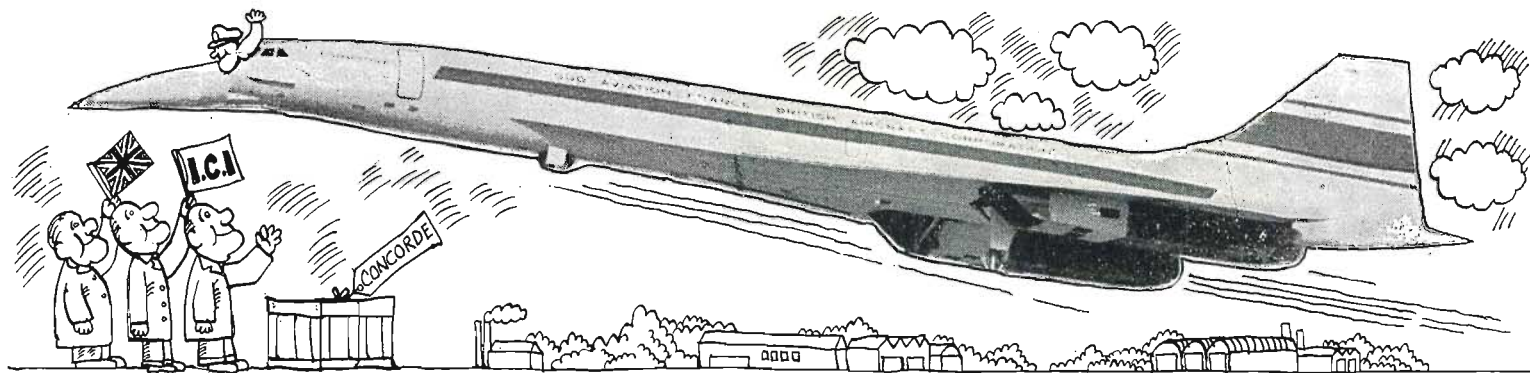
Dr Charles Bunn, former member of Plastics Division's research staff and now consultant to that Division, recently received in Philadelphia the 1969 American Physical Society's Award in High Polymer Physics, together with a \$1,000 prize. It was granted for 'pioneering research

on the crystal structure and crystallizability of macro-molecules.' Below, left, Dr Luis W. Alvarez, President, American Physical Society, gives Dr Bunn his award.

Through a series of researches, Dr Bunn, using X-ray diffraction and other methods, discovered the structure and arrangement of the molecules in polythene, rubber, nylon, Terylene, Fluon and other polymer materials. This knowledge played a fundamental part in the understanding of those special properties which give plastics their many uses. It also helped to show that the differences between rubbers, moulding polymers, and fibre-forming polymers are basically molecular. In manufacturing and fabricating these materials, his discoveries helped to make possible a closer control of their properties. In designing various new materials in this group the background he established was also a great help.

Dr Bunn, who is a Fellow of the Royal Society, a Fellow of the Institute of Physicists, a Fellow of the Chemical Society, and a member of the Faraday Society, joined Brunner Mond in 1927 and transferred to Plastics Division in June 1946. He retired from ICI in 1963.





Terylene on the job

Big changes are on the way in work clothing, because more and more Terylene/cotton blends are being used for it. Several clothing firms have developed garments which take advantage of the special characteristics of Terylene/cotton: toughness, washability, shrink-resistance, crease-resistance and longer wearing-life among them. These new styles are also more closely related to the needs of the job.

Two-piece suits have been designed as an alternative to the conventional boiler suit, for example, and at least one firm offers an outfit of trousers and short-sleeved shirt smart enough to wear at leisure as well as on duty. Boiler-suits, warehouse coats, bib and brace overalls are all acquiring a neater look, too.

Cheaper, quicker and better laundering methods have been made possible by the use of this material. 'Press-free' systems cut out conventional ironing and drying alike, relying on the 'memory' of Terylene which gives suitable fabrics the ability to return to their original shape and size again and again. The 'hot-box' involves passing washed and dripping-wet garments on hangers through a tunnel, where they are subjected to carefully-controlled heat. It is an accelerated continuous drip-dry system, completely automated except for loading and unloading. The Colmac 'Connie' handles each garment separately, slipping it over a 'former' which holds it to shape and dries it in a few seconds with hot air.

Sea and sky – with ICI

During April Concorde 002 made her first flight and the Cunard liner 'Queen Elizabeth 2' completed a successful trial voyage. In both, ICI and IMI products, a selection of which we mention below, were strongly represented. Outside Concorde, the paint is ICI's; inside, ICI's Fluon PTFE insulates 150 miles of cable. Brake parachute used in landing after test flight was ICI nylon – and so was the reinforcement in the plane's landing-wheel tyres. IMI – Europe's biggest titanium producer – is supplying large amounts of titanium for the airframe and the four engines of each Concorde. Inside QE 2 there are numerous applications of fibres and plastics in furniture, upholstery, sheets,

pillowcases and fittings: 90 per cent of all carpets contain Bri-Nylon, for example, and 900 Propathene chairs have been supplied for the crew. There are 3500 square yards of vinyl flooring, and hundreds of miles of cable and other electrical equipment have been installed. Plastics plumbing is on a record scale, while the 300 Perspex baths have saved 41 tons in weight. In all there are more plastics in the QE 2 than in any other ocean liner built so far.

Potash mine: site work starts

The start of site preparations for what by 1973 will be Europe's deepest potash mine, at Boulby, near Staithes, in North Yorkshire, was seen by Mr Fred Lee, Chancellor of the Duchy of Lancaster and Minister with special responsibility for the Northern Region, when he formally inaugurated construction work at the mine on April 16.

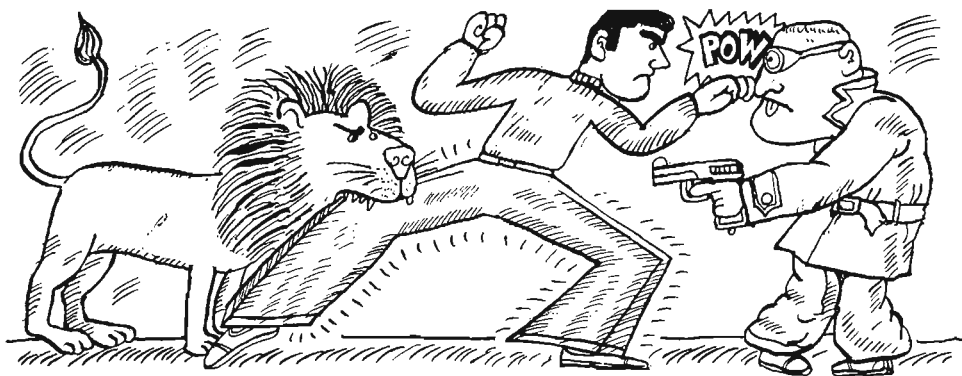
Mr Lee visited the site with directors of the operating company, Cleveland Potash Ltd,

formed last year by ICI, and Charter Consolidated Ltd, the international mining group. Also present were representatives of local authorities and organisations in the area.

Cleveland Potash intend to extract between one and one-and-a-half million tons of potash products a year from the mine, where large deposits of ore, comparable with the best in the world, have been located at depths of 3500–4000 feet. Conventional dry-mining techniques will be used and about 500 local people will find jobs at the mine, which will meet full UK potash requirements – now all imported – and provide a substantial amount for export. On present values, a one-million-tons-a-year output would make an annual improvement of £14m in the UK balance of payments.

During his tour Mr Lee was told how two-fifths of the 200-acre site will be developed to include minehead buildings, processing plant, storage and offices, and how the remainder is to be landscaped. The potash deposits lie under the North Yorks Moors national park and the mine installation will be about a mile inside the park's north-western boundaries, in an area of





old ironstone mine workings. Sir Frederick Gibberd, the landscape consultant, is advising Cleveland Potash on site selection, landscaping, layout and architectural design, to ensure that the site provides an acceptable industrial development within the area.

It is just over a year since the intention to mine for potash at Boulby was announced, after the existence of large deposits of ore had been established by extensive investigations which included drilling and seismic surveys. A public inquiry held last August by the Ministry of Housing and Local Government led to the granting of outline planning permission for the mine in November, and recently the North Riding County Council approved more detailed proposals, with the result that construction work could be started.

General manager for the project is Mr Ron Stedman, who as a member of the Agricultural Division of ICI has so far been project co-ordinator and has now transferred to Cleveland Potash. Chairman of the company is Mr N. K. Kinkead-Weekes, of Charter Consolidated. Mr G. J. Connolly and Dr T. H. Henry, of Agricultural Division, and Mr J. B. Mudd and Mr P. C. D. Burnell, both of Charter, are the other members of the Board.

Phillips-Imperial to make paraffin

Phillips-Imperial Petroleum Ltd, the crude oil refining company owned by ICI and the American Phillips Petroleum Co., is to begin production of paraffin for home heating on a large scale.

A 330,000-ton kerosene sweetening plant will be built at PIP's North Tees refinery. Purified kerosene (paraffin) will be sold for home heating and general commercial use by the refinery's sales agent, Phillips Petroleum Products Ltd.

This is the first major expansion of activity by PIP since 1966, when crude oil refining capacity was increased from 1 million to 5 million tons.

Designed by engineers of the Heavy Organic Chemicals Division of ICI and of Phillips-Imperial Petroleum Ltd, the new plant will use a licensed process. General contractor for construction will be ICI's Agricultural Division. Construction should start in mid-1969 and the plant will be completed in spring 1970.

Phillips Petroleum Products Ltd, a wholly-owned subsidiary of Phillips Petroleum (UK) Ltd, markets oil products from the PIP refinery. ICI takes the refinery's naphtha output for use in its petrochemical plants on Teesside.

Millions of trousers

A forceful advertising campaign for trousers containing Terylene is being mounted by ICI Fibres in the national newspapers during spring and early summer – the start of the peak selling period in Britain for men's trousers. Full colour will be seen in the three week-end supplements; full pages in the Daily Mirror, the Daily Sketch and smaller spaces in the Daily Express and the Daily Telegraph. Stressing the toughness – and elegance – of Terylene, the advertisements will show how trousers with Terylene keep their shape and their creases in action-packed, adventurous situations. They will also point out that there are now more colours, more patterns and more styles in these trousers than ever before. Terylene blends now dominate the trouser market. Sales rose 60 per cent in 1968 and ICI Fibres expect about 20 million pairs containing Terylene will be bought in Britain this year. Of these, nearly half will be 'durable press': crease and shape-retaining.

New post for Dr Duncan Davies

Dr Duncan Davies, who in 1962 became the first director of the ICI Petrochemical and Polymer Laboratory at Runcorn and more recently has been a deputy chairman of Mond Division, took up an important new post at Head Office in London on April 1 – as general manager, Research and Development.

He will have general responsibility for five Head Office departments: Research and Development; the Petrochemical and Polymer Laboratory; Central Instrument Laboratory; Central Technical Information Unit; and the Industrial Hygiene Research Laboratories, on other than medical matters.

He will also be responsible for the cohesion of the Company's non-Divisional research activities and for integrating them with Divisions' research functions; and he will help the Research and Development director, Mr J. D. Rose, to plan long-term policy.

In addition he will help to promote greater contact between ICI, the universities and Government centres of science and technology, and



With model of the new mine, left to right, N. K. Kinkead-Weekes, Fred Lee and R. Stedman



will be concerned in the career development of ICI research staff, particularly those working in non-Divisional laboratories.

Dr Davies, who has been succeeded as a Mond Division deputy chairman by Dr C. W. Suckling, the Division's research and development director, gained first-class honours in chemistry at Oxford in 1943 and a D.Phil. there in 1945, the year he joined Dyestuffs Division Research Department. In 1954 he moved to the Division's Grangemouth Works in Scotland in charge of process research. He became deputy research manager of the then General Chemicals Division in 1959 and two years later was appointed Division research director. He became director of the P and P Laboratory when it was opened in 1962 and in March 1968 he was made a Mond Division deputy chairman.

Dr Suckling, who has in turn been succeeded as Mond Division research and development director by Dr C. H. Reece, the Division's joint research manager, joined General Chemicals Division in 1942 after gaining first-class honours in chemistry at Liverpool University. After three years on research in the Division he returned to the University, where he obtained his Ph.D. in 1948. Further work in General Chemicals Division followed, before he moved to production in 1962, as assistant manager of Pilkington-Sullivan Works. He became assistant research director of the new Mond Division in 1965 and research and development director in 1967. Dr Suckling was co-inventor of 'Fluothane', the ICI anaesthetic, and in 1964 he received the Liverpool University Chemical Society's annual medal. He is honorary visiting professor of research management at the University of Stirling.

Dr Reece, who graduated B.Sc., Ph.D. at Leeds University in 1949, joined Dyestuffs Division the same year. He worked in the research department on coloured organic metallic complexes and anthraquinone dyes, and in 1958 became leader of an organic chemistry group involved in colour photography. In 1959 he was made head of the medicinals experimental group at Grangemouth. Three years later he became head of the colour experimental department, and in 1965 was appointed manager of works research and development. Two years ago he moved to Mond as a joint research manager.



The film 'Oh! What a Lovely War,' now showing in London, has battle scenes of the Western Front in World War One which called for imitation snow to cover an area of some 12 acres. 'Ufoam,' urea formaldehyde foam, marketed by ICI's Building Development Group as a cavity wall insulant, was used to create the effect of snow, seen above. It took three days to pump enough foam over the 12 acres of ground. As a follow-up, the BDG's insulation service are now carrying out trials for three more films which need wintry settings. Photograph: John Young/Transworld

Sir Walter Worboys

Sir Walter Worboys, former ICI commercial director, died on March 17 at the age of 69. Sir Peter Allen, ICI Chairman, writes:

The death of Sir Walter Worboys at the age of sixty-nine seems untimely to those who knew his resolute, urgent manner while he was with ICI. He joined Synthetic Ammonia and Nitrates Ltd at Billingham in 1925 and at the time of his retirement in 1959 he was ICI's commercial director.

He and I worked together on Plastics affairs for nearly a decade and later as colleagues on the ICI Board. When Sir Walter came to Welwyn in 1942 the Division was just, as it were, ready to 'take off.' His term of chairmanship from 1942 until 1948 was a notable period, when foundations were laid and preparations put in hand which enabled the Division to prosper and expand so much in the post-war years.

Particularly to his credit in those days was the founding of an Export Department which successfully fostered the Division's overseas business, so that exports have since rarely been below one-third of the Division's total sales.

Then too, in times of shortages he was ready to improvise and accept that half a loaf was better than no bread. Thus, the Division took on some rented buildings in Welwyn Garden City, in order to get wider research going, which served very well until the Headquarters site at Welwyn was developed with proper laboratory accommodation. He saw to it that the Division took over part of the Government chemical factory at Hillhouse in order to get PVC moving on a full-scale plant. I remember well going to Hillhouse with Walter on a freezing winter's day in 1943; we walked into a building so vast that the fog prevented us seeing the far end; we thought that that would be big enough even for our dreams – but it wasn't.

It was at Welwyn, too, that Walter first became interested in the industrial applications of design, an interest which became one of the most moving of his life and led him to the chairmanship of the Council of Industrial Design.

Those who knew Walter well found him a man of lively and enquiring mind, with wide interests and an agreeable sense of humour. A happy family man, he was always charming with children. He was certainly one of the architects of the modern ICI.



At a ceremony in Madrid last year, Mr Douglas Bell, chief executive ICI (Europa), Mr Robert Malpas, deputy chief executive, and Señor Sanchez Delgado, general manager of Alcudia, were decorated by the Spanish Government for their work on the Alcudia project. Left to right: Señor Lloret, managing director, Calvo Sotelo (see article); Señor Sanchez Delgado; Douglas Bell; Señor Sirvent, President of the Instituto Nacional de Industria; Robert Malpas

polythene at PUERTOLLANO

Robert Malpas

In Spain, the Company is represented by ICI (España) S.A. which sells many of its products there, while other companies in which it has a share, like Intorsa, Mevisa, Hispavic, Zeltia-Agraria, are responsible for dyes and pigments, PVC, plant protection products and pharmaceuticals respectively. Another rapidly developing and important company with a Spanish-sounding name in which ICI has a share is Alcudia, whose early days are here described by the deputy chief executive of ICI (Europa) Limited.

As far south of Madrid as Preston is from Edinburgh, past the Don Quixote country and just off the road to Cordoba, lies Puertollano, the site of a large Spanish petrochemical complex and of Alcudia.

In 1942, three years after the end of the Spanish Civil War, the state enterprise, Instituto Nacional de Industria, formed a subsidiary called Calvo Sotelo, who were given the job of exploiting the shale oil deposits at Puertollano to make lubricating

oils, paraffins and solvents. Lack of oil and foreign exchange justified the considerable effort of developing these natural resources. Today the old Puertollano installations, built in those early days, remind one of the older plants at Oil Works, Billingham, which of course were installed in the thirties originally for a similar job, the production of petrol from creosote.

In the 1950s plans began to be discussed for a refinery at Puertollano linked by pipeline to the port of Malaga, through which the crude oil would be pumped. The idea was then further expanded to include a naphtha cracker with derivative plants, and in 1958 many of those who were to be associated with this project met one of its major promoters, Sr Don Eduardo Angulo, now president of Calvo Sotelo, who was looking for an association with a company well-versed in the art of making polythene.

This was to be one section of a project involving a two million tons/year refinery with all its attendant plant, capable of producing a full range of oil products, plus a naphtha cracker and three major satellite plants – a major undertaking in a country which is as young industrially as Spain. The choice of ICI from among the world's polythene manufacturers, the subsequent discussions and the getting to know one

another, indeed the translation of ideas into signed agreements, took time, and over the years involved people from many sections of ICI. They included Dr John Sisson, then managing director of Plastics Division, and now an ICI director; Dr Bill Batten, then licensing head of the Division; and the late George Fowler, then head of ICI's Spanish subsidiary company, Azamon. Edgar Davis was responsible for the finance and John Copp for legal matters, while Douglas Bell, chief executive, ICI Europa, led the ICI team throughout.

On the Spanish side, in addition to Sr Angulo, a leading personality who has only recently retired from the scene, was Sr Capelo, chairman of Cros S.A. People like the Head of ICI (España), Bryan Hilton-Jones, John Gadsby, of Plastics Division, and myself came into the picture after completion of the negotiations.

In 1962 then, an agreement was finally signed between ICI and Calvo Sotelo, together with two other Spanish partners, Cros S.A. and Foret S.A., to form Alcudia S.A., to build a polythene plant at Puertollano and market its products.

In May 1963, Sr Sanchez Delgado and I, as joint general managers, set up shop with a temporary office, no staff, the agreement between the partners, an engineering contract with Plastics Division, a plot of land at Puertollano, and, most important of all, access to ICI's know-how for the manufacture of polythene. The polythene plant (initial capacity 30,000 tons) came on stream extremely well in March 1966 and in spite of the heavy start-up charges, broke even in its first year of operation. The plant made a substantial profit in 1967 and again in 1968. The company has altogether some three hundred employees, a turnover of about £6 million a year and a very competent technical service and selling organisation which operates throughout Spain.

By the end of 1966 I and the three other ICI men associated with the project, Ron Fuller on sales, Dick Woodward, liaison engineer and Forbes Hepburn, construction engineer, had left the undertaking and it was entirely in the hands of Sr Sanchez Delgado and his Spanish staff. The polythene plant was extended to about 50/60,000 tons per year, for which the final modification was completed in August last year. Plans are now well advanced to extend the plant further to 75,000 tons and beyond that to 100,000 tons. Recently ICI's shareholding has been increased from 37 per cent to 48½ per cent and a new agreement signed giving Alcudia complete access to ICI's polythene know-how. Alcudia now also has an 11,000 tons/year ethylene oxide plant with an associated glycol plant.

The basic ingredients of success have been that the polythene plant, conceived and designed by Plastics Division, worked – and was worked – extremely well, and equally important, the ethylene plant, owned by Calvo Sotelo, and the source of the main raw material, also got off to a

good start. The market expanded very much more quickly than forecast and prices stayed higher than in the rest of Europe, which allowed profits to be made almost immediately after the plant came on stream. Earning profits inspires confidence, leading to greater achievement.

Then there are the people. Right from the start, thanks to the vision and foresight of Sr Sanchez Delgado, the general manager, an excellent atmosphere was established in the company. Everybody in it worked towards the common goals of Alcudia. The success of this approach further cemented the very strong bonds that have always existed between the most senior people in the parent companies, in particular between Sr Angulo and Mr Bell.

The market has grown twice as fast as was predicted. The reason for this very large increase in consumption is evident in every Spanish village that you drive through, even in the poorest parts. There you will now see plastics utensils adorning the exterior of the local grocer's shop and the supermarkets. Whereas four or five years ago wood or metal containers were too dear to buy, today plastics articles are so cheap that people buy them.

If you go and play golf on some of the lovely golf courses down between Marbella and Gibraltar, your caddie will no doubt be wearing plastics sandals; seven years ago he would probably have been barefooted. This section of the population is for the first time buying articles which previously were beyond its reach. In 1965, even before Alcudia had started up, the plastics boom was beginning. In spite of a world shortage and high world prices in that year, Spain consumed 45,000 tons of low-density polythene, twice as much as we had forecast three years earlier.

One of the first tasks when setting up Alcudia in 1963 was to form a technical service department and to build a technical service laboratory. This we did some two years before the plant actually started up: a major factor in establishing Alcudia as a high-quality supplier, this service continues to give the company great strength in the market-place.

This again is a simple and obvious idea to most people but the concept was new in Spain, although not to our partners; but many Spanish companies are reluctant to spend the money that technical service involves. They argue that most of the plastics converters are self-made men with little formal training and therefore that there is a danger in trying to blind them with technical service science. We were told that technical service 'people would simply not be received in most plastics converters' offices. In fact, self-made or not, the standard of plastics converter in Spain is generally very high and they welcome the technical service advice that is given.

The ICI staff on this project have returned from Spain now, but they all retain a lasting affection and respect for the country and its people. (19)



Above right: an Alcudia employee fills a sack with Alkathene brand polietileno, made by Alcudia. Above left: a corner of the technical service laboratory. Below: general view of the Alcudia polythene plant at Puertollano. Current capacity of the plant is 60,000 tons, and the company has 300 employees and a turnover of some £6m a year



